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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LAPAGE, MICHAEL P

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,075	Applicant(s) SCOTT ET AL.	
	Examiner MICHAEL LAPAGE	Art Unit 2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-16 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-16 and 19-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-3, 5-16, and 19-21 are presented for examination, claims 4, 17, 18, 22-23 were cancelled in amendment filled.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 1, it is unclear to the examiner the difference between the inspecting means and the additional now amended detector means as the examiner believes there should be only one detecting means within the system, and where applicant has now amended in a second detecting means. Therefore the examiner is interpreting the inspecting means and detecting means to be one detector and not multiple detectors within the system.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-3, 5-7, 9, 11, 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuchel (U.S. PGPub. No. 2003/0128368 A1).**

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As to claim 1, Kuchel discloses and shows in figure 12, an apparatus for indicating the departure of a shape of an object from a specified shape, the apparatus comprising:

radiation means (1 and 2) for directing an incident beam of radiation onto the object ([0037], lines 1-4; [0038], lines 1-4) , and

inspecting means (21 and 24) for inspecting the final beam after transmission by or reflection from said object ([0129], where the CCD cameras referenced are CCD cameras 21 and 24),

at least one wavefront shaping means (11 and 13 which includes planar wavefront forming surface 12) is disposed between the radiation means and the inspecting means, wherein the apparatus is arranged so that the final beam will have a substantially planar wavefront when said object has said specified shape, and said at least once wavefront shaping means is arranged to compensate for non-planarity introduced by said object having said specified shape, and said inspecting means is arranged to determine any departure of the wavefront of the final beam from planarity, wherein said inspecting means comprises ([0126]-[0127]; where the device is using the plane reference wave of surfaces 12 and comparing them with the wave produced by test object 16 in order to determine the departure of the wave from planarity):

beamsplitting means (23) for splitting the final beam into two or more beams and for directing said two or more beams to laterally displaced locations (i.e. detectors 21 and 24 being interpreted to be at laterally displaced locations) ([0129]); and

detector means (21 and 24) for detecting radiation intensity of said two or more beams on the detector means ([0129], where the CCD cameras referenced are CCD cameras 21 and 24).

As to claim 2, Kuchel discloses and shows in figure 12, an apparatus wherein said radiation means (1 and 2) is arranged to produce a collimated beam (i.e. by collimator lens 9) of radiation ([0038], lines 9-12).

As to claim 3, Kuchel discloses an apparatus wherein said incident beam of radiation is optical radiation ([0021], where the system can be setup to use optical radiation).

As to claim 5, Kuchel discloses and shows in figure 12, an apparatus wherein at least one said wavefront shaping means is located between the radiation means and the object (Fig. 12, explicitly showing wavefront shaping means 11 between radiation means 1 and 2 and object 16).

As to claim 6, Kuchel discloses and shows in figure 12, an apparatus wherein at least one said wavefront shaping means is located between the object and the inspecting means (Fig. 12, explicitly showing wavefront shaping means 11 between radiation means 1 and 2 and detecting means 21 and 24).

As to claim 7, Kuchel discloses and shows in figure 12, an apparatus wherein at least one said wavefront shaping means comprises a lens or curved reflector (Fig. 12, explicitly showing a lens in wavefront shaping means 13).

As to claim 9, Kuchel discloses and shows in figure 12, an apparatus wherein at least one said wavefront shaping means is provided by a spatial light modulator (19)

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([0041], lines 5-7; additionally figure 13 shows a chopper that could also be interpreted as a spatial light modulator).

As to claim 11, Kuchel discloses and shows in figure 12, an apparatus comprising a beam splitter between said source and said inspecting means ([0041], lines 5-7).

As to claim 14, Kuchel discloses an apparatus wherein the inspecting means is arranged to provide an analysis of the shape, or components of the shape, of the wavefront of the final beam ([0014], lines 1-13; and where as explained the system can also use a planar wavefront reflected off surface 12).

As to claims 15 and 16. Apparatus according to claim 1 wherein the detector means of the inspecting means comprises a pixelated imaging photosensor (i.e. CCD 21 and 24) such wherein the pixelated imaging photosensor is a charge coupled device (CCD) array ([0129]).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8, 10, 12-13 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchel.

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As to claims 8 and 12, Kuchel does not explicitly disclose an apparatus wherein at least one said wavefront shaping means and beamsplitting means comprises a diffraction grating or hologram.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace a lens with a diffraction grating since the examiner takes Office Notice of the equivalence of lenses and diffraction gratings for their use in the optical art and the selection of any of these known equivalents to redirect light would be within the level of ordinary skill in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuchel with a diffraction grating in order to provide the reduction in cost of producing a diffraction grating compared with a high quality lens.

As to claim 10, Kuchel does not explicitly disclose an apparatus and including means for adjusting the relative position of the object and a said wavefront shaping means.

However, Kuchel does disclose in ([0015], lines 1-7) where the legs of the interferometer have supports for positioning. One of ordinary skill in the art at the time the invention was made would recognize that in an optical lens system the lenses and object are obviously moveable in order to direct light in specific paths and at specific focus points.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuchel by providing a moveable object and

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wavefront shaping means in order to provide the advantage of a versatile system that can accommodate many optical components through repositioning.

As to claims 13 and 19, Kuchel does explicitly disclose a method of indicating the departure of a shape of an object from a specified shape, the method including the steps of:

directing an incident beam of radiation onto the object so that that a final beam following transmission by or reflection from said object would have a planar wavefront if the object has said specified shape, said incident beam passing through at least one wavefront shaping means disposed between a source of said radiation beam and an inspecting means ([0126]-[0127]; where the device is using the plane reference wave of surfaces 12 and comparing them with the wave produced by test object 16 in order to determine the departure of the wave from planarity); and

inspecting the final beam in said inspecting means for any departure of its wavefront from planarity, wherein the step of inspecting said final beam comprises the step of ([0126]-[0127]; where the device is using the plane reference wave of surfaces 12 and comparing them with the wave produced by test object 16 in order to determine the departure of the wave from planarity):

splitting the final beam (i.e. by beamsplitter 23) into two or more beams ([0129]); and

Kuchel does not explicitly disclose directing said two or more beams to laterally displaced locations on a detector.

However, does disclose and show in Figure 12 and in ([0129]) where multiple detectors are used instead of one to detect the split final beam. It would have been obvious to one of ordinary skill in the art at the time the invention was made to condensing the light down to just one detector array with enough space to register both split light beams since it is known in the art that the light can easily be split into two parts and directed at one detector in a first in second area.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kuchel by only using one detector and detecting two beams in separate first and second areas of the detector in order to provide the advantage of reduced cost from the removal of one of the CCD detecting units.

As to claim 20, Kuchel discloses a method wherein said object is an optical component (Explicitly shown in Fig. 12, item 16).

As to claim 21, Kuchel disclose a method wherein said optical component is a window or is of generally laminar form, or comprises a planar reflective surface (Explicitly shows in Fig. 1A test object 18 which as shown has a back planar reflective surface).

Response to Arguments

8. Applicant's arguments with respect to claims 1-3, 5-16, and 19-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL LAPAGE whose telephone number is (571)270-3833. The examiner can normally be reached on Monday Through Friday 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael LaPage/
Examiner, Art Unit 2886

/TARIFUR R CHOWDHURY/
Supervisory Patent Examiner, Art Unit 2886